

Serial No. 09/546,174

Reply to Office Action of August 25, 2005

REMARKS/ARGUMENTS

Claims 50-69, 72-74, 78-88 and 90-102 are pending in this application. All pending claims are finally rejected. Claims 50, 61, 80, 81, 83, and 90 have been amended. No claims have been cancelled. Further consideration of the application is respectfully requested in light of the claim amendments above, and the following remarks.

Claim 83 stands rejected under 35 USC 112, first and second paragraphs. The rejection of claim 83, as amended, is respectfully traversed. Firstly, claim 83 has been amended to remove the recitation of "the plasma based processes" and claim an "HDPCVD process". No new matter has been introduced into claim 83. Support for the amendment to claim 83 is found in the specification at page 6, lines 25-27:

The cap layer may serve a number of functions, acting as an antireflective coating, a hard mask for metal line etching, and a protector for the top corners of metal wiring lines during the HDPCVD process.

Support is also found in the specification at page 12, lines 13-14

In addition, the cap layer 28 may also act as a wiring line top corner protector during subsequent HDPCVD processing, which will be discussed below.

Claim 83 has been amended accordingly. Claim 83, as amended, is deemed to address the lack of antecedent basis and is now properly allowable under 35 USC 112, second paragraph. In addition to addressing the rejection under 35 USC 112, second paragraph, the above amendment and specification citations are also deemed to fully address the rejection of claim 83 under 35 USC 112.

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first paragraph.

Claims 50-60, 78, 79, 94-98, and 100 stand rejected under 35 USC 112, second paragraph. The rejection of claim 50, as amended, is respectfully traversed.

Claim 50 has been amended to more properly claim the location of the photoresist layer as a whole. No new matter has been introduced into claim 50. Support for the amendment to claim 50 is found in the specification at page 10, lines 20-22:

Next, a layer of photoresist is provided over the cap layer 28 and the photoresist is shaped to form an etching mask 30 so that the surface of cap layer 28 is exposed at regions 32 where trenches will be formed by etching and wiring lines defined.

Claim 50 has been amended accordingly. Claim 50, therefore, is deemed to be allowable under 35 USC 112, second paragraph. The remaining dependent claims are also deemed to be allowable as being dependent upon allowable claim 50 for the reasons given above.

Claims 50-60, 78, 79, 94-98, and 100 stand rejected under 35 USC 112, first paragraph, with respect to providing a conductive layer on the wiring layer. The rejection of these claims under 35 USC 112, first paragraph, is respectfully traversed.

The wiring layer is clearly identified in, for example, FIG. 1 as being layer 24. A protective layer 26 is clearly shown in FIG. 1 as being formed on wiring layer 24. Page 10, lines 7-10 of the present specification state that: "When layer 26 is used as part of an antireflection coating on the wiring line layer 24, it is preferable that the layer 26 be highly conductive, provide stable ohmic contacts to a variety of metals, and to be absorptive at the wavelength used to expose the photoresist layer during formation of the etch mask."

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As there is proper support for the existence of a "conductive layer", it is respectfully submitted that claiming layer 26 as a "conductive layer" is proper and allowable under 35 USC 112, first paragraph. No claim amendments have been made to address this rejection. In particular, the above quotation from the specification is also deemed to address the rejection of claim 52.

Claims 50-69, 72-74, 78-88, and 90-102 stand rejected under 35 USC 103(a) as being unpatentable over Tobben et al in view of JP 8-288285. The rejection of claims 50, 61, and 80, as amended, is respectfully traversed.

Claim 50 has been previously amended to overcome a rejection under 35 USC 112, second paragraph, regarding the relationship between the photoresist layer and the cap layer. The amendment of claim 50 is also deemed to address the rejection under 35 USC 103(a). Claims 61 and 80 have been similarly amended to address the rejection under 35 USC 103(a). No new matter has been introduced into claims 61 and 80 for the reasons given above with respect to the amendment to claim 50. Claims 81 and 90 have been amended only to properly depend from claim 80.

There is no embodiment in JP 8-288285 that shows the photoresist layer being on the cap layer in conjunction with the other claim elements, as amended. JP 8-288285 teaches only that a TiN anti-reflective layer 104 is formed over the wiring layer 103 and is closest to the photoresist layer 106. See, for example, FIG. 6 of JP 8-288285.

In addition, Tobben et al only teaches that the cap layer reduces interference. There are no teachings in Tobben et al regarding combining a cap layer with a protective layer and a photoresist layer as claimed, so that a graded index of refraction is formed between the protective layer and the photoresist layer, i.e. an index of refraction in a middle layer that is between the index of refraction of the two other layers.

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The combination of Tobben et al and JP 8-288285 is thus deemed to be improper. The suggested combination of Tobben et al and JP 8-288285, without extensive modifications using the present invention as a guide, will not result in the present invention, but rather a structure in which the TiN ARC layer is directly in contact with the photoresist layer and/or a structure that does not provide the benefits of the claimed invention. Further, there are no suggestions in either or the references as to how exactly the references are to be properly combined to achieve the present invention as claimed other than using the present invention as a guide.

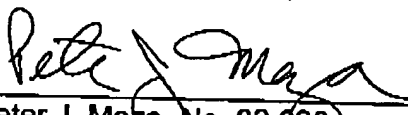
For these reasons, claims 50, 61, and 80, as amended, are deemed patentable over the hypothetical combination of Tobben et al and JP 8-288285 and allowable under 35 USC 103(a). The remaining claims are deemed to be allowable as being dependent upon an allowable base claim.

In view of all of the above, the claims are now believed to be allowable and the case in condition for allowance which action is respectfully requested. Should the Examiner be of the opinion that a telephone conference would expedite the prosecution of this case, the Examiner is requested to contact Applicants' attorney at the telephone number listed below.

No fee is believed due for this submittal. However, any fee deficiency associated with this submittal may be charged to Deposit Account No. 50-1123.

Respectfully submitted,

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